tensile strength and Young's modulus thereof increase, as compared with those of the UHMWPE molded article obtained from the non-irradiation test of Comparative Preparation Example 3. Particularly, the melting point rises from 138.0° to 149.5° C.

TABLE 1

	Dose of irradiation MR	Compression deformation Temperature (° C.)	Compression ratio	Cooling	Wear factor (WF)	Coefficient of friction (CF)
Preparation Example						
1	0.5	200	3	standing to cool	9.07×10^{-7}	0.11
2	0.5	200	4.5	standing to cool	2.78×10^{-7}	0.08
3	0.5	200	6	standing to cool	5.31×10^{-8}	0.03
4	1.0	200	3	standing to cool	7.35×10^{-7}	0.04
5	1.5	200	3	standing to cool	4.62×10^{-7}	0.02
6	2.0	200	3	standing to cool	8.31×10^{-8}	0.01
7	1.0	130	3	standing to cool	9.64×10^{-7}	0.12
8	1.0	200	3	allowed to cool after the isothermal crystallization for 10 hours at 120° C.	2.53×10^{-8}	0.01
Comparative Preparation Example						
1	—	200	3	standing to cool	15.3×10^{-7}	0.14
2	—	200	4.5	standing to cool	16.4×10^{-7}	0.15
3	—	200	6	standing to cool	14.9×10^{-7}	0.12

TABLE 2

Sample	Density (g/cm³)	Heat of fusion (cal/g)	Melting point (° C.)	Tensile strength (kg/cm²)	Young's modulus (kg/cm²)
Comparative Preparation Example 3	0.931	31.6	138.0	0.3×10^3	1.36×10^4
Preparation Example 3	0.948	39.2	149.5	1.3×10^3	1.95×10^4

INDUSTRIAL APPLICABILITY

The ultra high molecular weight polyethylene molded article for artificial joints obtained according to the present invention has the molecular orientation or crystal orientation in the molded article, and is low in friction and is superior in abrasion resistance, and therefore is available as a components of artificial joints.

Further, the ultra high molecular weight polyethylene molded article for artificial joints of the present invention can be used as a component for artificial hip joints (artificial acetabular cup), a component for artificial knee joints (artificial tibial insert) and the socket for artificial elbow joints, and in addition to the medical use, it can be applied as materials for various industries by utilizing the characteristics such as low friction and superior abrasion resistance.

What is claimed is:

1. An ultra high molecular weight polyethylene molded block having a molecular weight not less than 5 million, having been crosslinked slightly and having been compression-deformed in a direction perpendicular to a compression plane, cooled and solidified in a compression-deformed state under pressure so as to have orientation of crystal planes in a direction parallel to the compression plane, and a thickness range of 5 to 10 mm in a direction perpendicular to the compression plane.

2. The molded block of claim 1, wherein a melting temperature of the ultra high molecular weight polyethylene is in a range of 135 to 155° C.

3. A method for producing an ultra high molecular weight polyethylene molded block having orientation of crystal planes in a direction parallel to a compression plane, comprising slightly crosslinking an ultra high molecular weight polyethylene molded block having a molecular weight not less than 5 million by irradiating the block with a high energy ray and thereby introducing a very small amount of crosslinking points into molecular chains of the block, then heating the crosslinked ultra high molecular weight polyethylene molded block up to a compression deformable temperature, compression-deforming the block by compressing the block in a direction perpendicular to the compression plane so as to deform the block, and then cooling the block while keeping the block in a deformed state under pressure, said block after cooling having a thickness range of 5 to 10 mm in a direction perpendicular to the compression plane.

4. The method of claim 3, where the high energy ray is a radioactive ray and a dose of the irradiation is in the range of 0.01 to 5.0 MR.

5. The method of claim 3 or 4, wherein the compression-deformable temperature is in a range of 50° C. lower than a melting temperature of the crosslinked ultra high molecular weight polyethylene to 80° C. higher than the melting temperature.

6. The method of claim 3, 4 or 5 wherein a weight-average molecular weight of the ultra high molecular weight polyethylene before irradiation is in a range of 2 to 8 million.

7. An ultra molecular weight polyethylene molded block having orientation of crystal planes in a direction parallel to a compression plane, said block produced by slightly crosslinking an ultra high molecular weight polyethylene block having a molecular weight of not less than 5 million by irradiating the block with a high energy ray and thereby introducing a very small amount of crosslinking points into molecular chains of the block, then heating the crosslinked block up to a compression deformable temperature, compression-deforming the block by compressing the block in a direction perpendicular to the compression plane so as to deform the block, and then cooling and solidifying the block while keeping the block in a deformed state under pressure, said block after cooling and solidifying having a thickness range of 5 to 10 mm in a direction perpendicular to the compression plane.

8. Artificial joint for implantation in a joint of an animal, the joint comprising a joint component formed from an ultra high molecular weight polyethylene molded block having a molecular weight of not less than 5 million, having been crosslinked slightly and having been compression-deformed in a direction perpendicular to a compression plane, cooled and solidified in a compression-deformed state under pressure so as to have orientation of crystal planes in a direction parallel to the compression plane, said block having a thickness range of 5 to 10 mm in a direction perpendicular to the compression plane.

9. Artificial joint according to claim 8, the joint for implantation in a joint of a human being.

10. Artificial joint for implantation in a joint of an animal, the joint comprising a joint component formed from an ultra high molecular weight polyethylene molded block having a molecular weight of not less than 5 million, having been crosslinked slightly and having been compression-deformed in a direction perpendicular to a compression plane so as to have orientation of crystal planes in a direction parallel to the compression plane, wherein said block having a thickness range of 5 to 10 mm in a direction perpendicular to the compression plane and the melting temperature of the molded block is in a range of 135 to 155° C.

11. Artificial joint according to claim 10, the joint for implantation in a joint of a human being.

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